Redefining Aging: Brain Research

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The single greatest system ever designed in the history of the universe is your brain. Your brain is responsible for your every thought, emotion, and behavior. Unfortunately we humans do not know much about our brains and it is time to change that.

Brain Basics:

1. Your brain weighs 2 to 4 pounds.

2. Your brain is comprised of 60% fat and is the fattiest system in your body.

3. Your brain consumes 25% of the blood from every heartbeat.

4. Your brain has two sides or hemispheres (left hemisphere and right hemisphere).

   Left hemisphere helps you with language, detail, and analysis

   Right hemisphere helps you with faces, spatial orientation, sounds.

5. Your brain has a Cortex and Subcortex.

   Your Cortex is conscious and helps you learn, remember, communicate, read, write, orient to space, process sensory information, and personality.

   Your Subcortex processes subconscious motor or procedural behaviors such as dressing, driving, and typing on your computer.

   Your Cortex and Subcortex interact as a beautiful symphony.

6. Your hippocampus is the structure in your brain (sits in the middle of each temporal lobe just under each temple on your skull) that enables you to learn.

New Ideas about Your Brain:

The human brain (like the animal brain) can generate new brain cells. This new brain cell development (neurogenesis) occurs in the hippocampus.

The human brain is now thought to have "neural plasticity" or be a system that is highly dynamic, constantly reorganizing, and malleable. It is shaped by environmental input.

Our brains need exposure to environments that are enriched, complex and novel. Environments that are passive and rote do not help the health of your brain.

Exposure to enriched environments across your lifespan will lead to new brain cell development and increased cellular connections (**"Synaptic Density"**). Synaptic Density or **Brain Reserve** may help to delay the onset of neurodegenerative diseases such as Alzheimer's and related dementias.

Your Brain Health

1. Brain health begins in the womb and needs to be promoted across your lifespan.

2. Engage in the novel and complex not the rote and passive.

3. Consider the following Brain Health Lifestyle to build up your brain reserve:

Five Domains of the Brain Health Lifestyle:

Socialization

Do not isolate or segregate as you get older. People who isolate have a higher risk for dementia.

Join groups and social organizations in your community.

Maintain and build your friendship and family network.

Be forgiving.

Develop hobbies.

Do not retire.

Physical Activity

Walk between 7,000 and 12,000 steps daily. Walking several times a week reduces the risk of dementia.

Buy yourself a pedometer to remind yourself to walk and to keep track of your daily steps.

Dance as this is a behavior that reduces the risk of dementia.

Garden and Knitting reduce the risk of dementia.

Aerobic exercise will help the heart and thereby feed the brain with the necessary blood and oxygen. It also promotes cognitive functioning such as memory and is now believed to relate to positive structural changes in the brain.

Use both sides of your body more often: Become ambidextrous.

Mental Stimulation

Learn a second language.

Read and write (use your nondominant hand) on a daily basis: the more complex the better.

Learn sign language as it increases IQ and increased IQ reduces the risk of dementia.

Play board games as board game playing reduces the risk of dementia.

Travel reduces the risk of dementia because it involves a new and complex environment.

Play a musical instrument.

Listen to classic music as it helps to increase learning.

Problem solve.

Spirituality

Pray on a daily basis as it enhances your immune system.

Attend regularly a formal place of worship at it relates to better quality of life and longevity.

Learn to meditate in order to slow down. Animals exposed to environments that are too stimulating demonstrate slowed brain development.

Learn relaxation procedures with deep breathing and muscle relaxation.

Slow down and do not be afraid to say "no".

Nutrition

Eat 80% of what you intend to eat at each meal. Reasonable caloric restriction can increase your longevity.

Eat with utensils and you will eat less and also eat healthier foods.

Increase your intake of Omega 3 fatty acids. This includes fatty fish such as salmon, sardines, and herring. Several ounces of salmon weekly reduce the risk of dementia. Walnuts and unsalted nuts are also good for you.

Increase your intake of antioxidants. This includes Vitamins C and E. Colored fruits (grapes, apples, cantaloupe, and berries) and vegetables are good for you. The FDA recommends five servings of fruit and vegetables a day.

Decrease your intake of processed foods and red meats. Lean meat such as chicken breast without skin is relatively okay.

Green leafy vegetables are good for you.

Eat one sit down meal with others a day. This activity provides many brain boosting effects at once (classic music, language, eating with utensils, slowing down, eating healthier foods).

Begin Your Brain Health Program Today!!

Order Dr. Nussbaum's new book *Your Brain Health Lifestyle: A Proactive Program to Preserve Your Life Story* (1-800-827-7903)

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Learning and Dementia

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Dementia

Dementia is a general decline in intelligence that involves loss of memory and other cognitive abilities resulting in functional impairment. There are over 70 causes of dementia and 95% of all dementias are considered irreversible.

The leading cause of dementia in the United States is Alzheimer's disease that affects nearly 4.5 million Americans. It is estimated that by 2050 15 million Americans will suffer Alzheimer's. At this time there are only five FDA approved drugs to treat the symptoms of Alzheimer's and there is no know cause or cure.

For older Americans the fear of losing their memory and thinking ability is real, particularly as our society emphasizes loss with advanced age. In addition many of the 76 million baby boomers (those born between 1946 and 1964) provide direct or ancillary care for their parent with dementia and naturally develop a fear of their own future.

Despite our abundant resources and leadership in science and medicine we do not have an understanding of health or a belief in the proactive approach to health. It is critical our society adopt a proactive approach to brain health that not only identifies those at risk for future dementia, but champions a brain healthy culture beginning in the womb. To achieve this agenda we must identify those behaviors and interventions that can maximize brain development and then educate the nation on the importance of being proactive.

A New Understanding of the Human Brain

Tradition holds that the human brain is a fixed and rather limited system that develops its potential in the early years of life. Neurons are considered finite and once a neuron dies it cannot regenerate. These traditional ideas contrast with animal research that demonstrated the ability of the animal brain to generate new brain cells. The new brain cells were born in the *hippocampus*, a region critical for memory and new learning.

Recent research suggests the human brain has the same neuronal regenerative capacity as the rodent! Importantly, and certainly not coincidentally, new brain cell development was found in the same region of the human brain (the hippocampus) as the animal brain. This research offers a new understanding of the human brain and provides a counter to the traditional approach. The human brain may actually be a system with significant flexibility, capable of reorganizing and being shaped by environmental input. Indeed, the three critical factors that led to new brain cell development in the animal may also be significant to the human brain. These include *socialization, physical activity, and mental stimulation*. Collectively, these three factors contribute to what has been called an enriched environment.

We already know the animal brain responds positively in structure and function when exposed to an enriched environment. Given our new understanding of the human brain it is reasonable to expect the same outcomes for a human brain when exposed to similarly enriched environments. Viewed from this perspective, the human brain can be conceptualized as a system to be shaped and developed for health. A fundamental question is "what are the proper enriched environments to maximize brain health at different stages of the lifespan?"

Lifestyle Behaviors and Health of the Human Brain

Throughout life the human brain is nurtured by information and stimuli that is complex and novel. In contrast, environments that enable a rote and passive process will likely be more harmful than helpful. Another important and useful method for framing brain health is to utilize the three critical factors of an enriched environment discussed earlier (socialization, physical activity, and mental stimulation).

Human beings who isolate and segregate throughout life, but particularly as they get older, have a corresponding increased risk of suffering dementia. Isolation not only prevents human interaction, it can easily lead to passive and rote processes. Having a meal with other humans is a wonderful activity that promotes brain health, particularly if the food is rich in omega 3 fatty-acids (ie., salmon), and vitamins E, B, and C).

Physical activities such as walking daily, dance, gardening, physical exercise, and knitting have been shown t reduce the risk of dementia. Interestingly, we need to use both sides of our bodies to complete these activities which means we are using both sides of our brain. An ambidextrous brain is likely healthier than a brain with one dominant side and one relatively dormant side. Unfortunately we are encouraged throughout our life to utilize one side of our body.

Mental stimulation encompasses a broad spectrum with board game playing, language development, sign language (even prior to oral language development), and travel relating to reduced risk of dementia. Prayer and meditation also have a positive effect on the brain even in those suffering dementia. Individual pursuit of activities that are novel and complex will foster brain health by developing neuronal connections that underlie experience and learning.

One of the most powerful mental stimulating activities for the human brain is learning. By definition, learning involves novel information that can also be complex. The second we learn something new we have changed the structure and most likely the function of the brain. As we learn new information we stimulate the hippocampus which enables our encoding and eventual permanent storage of information. Recall, it is the hippocampus that appears to have regenerative capacity and it is the same hippocampus destroyed by Alzheimer's disease.

Because learning is so vital to the health of the human brain it is important that we expose ourselves to new and ongoing learning opportunities. Lifelong learning programs have gained in popularity and more older Americans are enrolled in college courses than ever before. It is time our nation recognizes learning as a health promoting activity that is not only good for the brain, but necessary! To this end, some financial incentive for Americans to continue learning long after the primitive notion of K-12 should be part of every health care plan. Library systems also represent a major vehicle for learning and brain health, particularly for boomers.

A review of our lifestyle not only for our cardiac health, but our brain health is important. We need to reduce the time we spend engaged in rote and passive pursuits and increase our exposure to the novel and complex. While it is normal not to want to do this, it is most likely far too beneficial not to try. The activities listed above are researched- based and represent a good place to start the review. Everyone is encouraged to seek out and engage in new learning opportunities, particularly in content areas that are foreign to us.

Resource: Love Your Brain: A Guide to Brain Health across the Lifespan by Paul D. Nussbaum (www.paulnussbaum.com)